

The Political Philosophy of Science in Historical Perspective: The Road Through Popper and Polanyi to the Present

Stephen Turner

THE ENLIGHTENMENT RECONSIDERED

One Enlightenment issue is particularly central. Science in the narrow sense is not sufficient for human progress. Carrying out the task of making science benefit society necessarily required a significant degree of knowledge of the social world. Yet this knowledge has always proven to be problematic, difficult to regard as scientific, and in conflict with politics. The difficulties were immediate: in the aftermath of the restoration of French politics as part of the return to normalcy after the revolution in 1803, the section on social and political science of the French academy was suppressed, marking out a line between acceptable science and dangerous science and depriving science of the means of applying itself to the good of society. Social and political speculation then fell to thinkers outside the academy, notably Henri de Saint-Simon, who revived Condorcet's ideas about the relation of science and technology to progress, but reconsidered many Enlightenment ideas, notably the program of secularization, in the light of the Revolution and its failures.

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This story is well known and need not be repeated here. Saint-Simon's young secretary, Auguste Comte, revised and extended Saint-Simon's sketchy but illuminating ideas into Positivism, a complete intellectual system and program which provided both a philosophy of science and a model for the relations of science and society as well as a repudiation of liberalism, which Comte and most of the advanced Continental thinkers of the time regarded as a transitory historical phenomenon doomed by its overwhelming defects. For Comte and Saint-Simon, these defects were at the heart of the problem of the relation between science and society and science and politics. Comte, in the most explicit of terms, stated his disgust for the idea that everyone should be permitted to have their opinion heard (1864, IV, pp. 50ff).

The reasoning here is simple, and poses the most fundamental issue: one model of science stresses consensus and authority. This was Saint-Simon's: within science, scientific merit was transparent, and poor scientists would naturally recognize and defer to greatness in others, creating within science a natural hierarchy which was a desirable model for the natural hierarchy of the new scientific and industrial order he envisioned. Authority and consensus within science have implications for what is outside of science. If science is correct, and science is a sufficiently extensive activity to comprise knowledge of such things as the social world, why shouldn't scientists rule, and rule to the exclusion of the ignorant? Is not the rule, *de facto* if not *de jure*, of scientists the condition of progress? And if the understanding and recognition of the authority of science are the central conditions of progress, shouldn't science be imposed on the ignorant as the dogmas of Catholicism had been so effectively imposed in the past, using the same techniques? Comte makes this argument explicit:

there is no liberty of conscience in astronomy, in physics, or even in physiology, that is to say everyone would find it absurd not to have confidence in the principles established by the men of these sciences. If this is not so in politics, this is due only to the fact that since the old principles have yet to be abandoned, and no new ones have yet been devised to replace them, there are really no fixed principles at all in the meantime. (Ibid., p. 49n)

The main item on the agenda of progress for Comte was to overcome the anarchy of opinions produced by the situation in which the ignorant and the expert were equally empowered to give their opinions.

Of course, freedom of conscience and open discussion is the bedrock of liberalism, so the anti-liberal implications of science as a model for politics are evident. But at the same time, there was, only partly developed, what might be called a liberal conception of science, which is to say one which de-emphasized, even obscured and denied, the issue of the authority of science in favor of a model of free discussion that applied equally to science and politics. James Mill is perhaps the person whose boundless faith in discussion best exemplifies this intuition, but John Stuart Mill's *On Liberty* (1978) is perhaps its greatest expression. But Mill does not mention science in this essay and did not engage directly the puzzle of the existence of scientific "authority" in a non-authoritarian social order. There was, however, a "liberal" critique of the corrupting effects of science's dependence on state patronage in Thomas Henry Buckle (1924), similar concerns about state influence in Condorcet (1976), and protections of the freedom of scientific discourse were written into the rules of the Royal Society. These were primitive elements of an alternative image of science.

PEARSON AND MACH

The underground influence of Comte's core ideas was substantial, but the most consequential influence was mediated through two thinkers: Ernst Mach, who developed and popularized a philosophy of science which was congenial to certain subsequent developments, notably Logical Positivism, and served as a carrier for some key ideas of Comte's, and Karl Pearson, who had imbibed Comte at Cambridge from a librarian. As social and political thinkers as well as philosophers of science, they had much in common. Both held that the age of coercion or brute force had passed and sought some sort of surrogate for religion. Each was a socialist with an anarchist streak, though they expressed the latter differently. Mach was hostile to the state, at least as presently constituted. Pearson thought that present institutions needed to be "dynamited," but at the same time imagined that the revolution could be made from above by persuasion, and that the aristocracy could be persuaded to part with its wealth. Both saw science as having an integral role in this transformation, and each of them thought that spiritual transformation in the direction of a scientific cast of mind in the public was a necessary part of this. Both thought that Buddhism, as a non-deistic religion, offered a model for appropriate religiosity. And both had a conception of science which minimized and was suspicious of the theoretical and of realism. Each resisted the theoretical

innovations of his time: Mach the atom, Pearson the gene. Each was attracted to the idea of efficiency as an organizing concept in science with implications for politics. Both had what might be called an extensive view of science, considering science to be the source of social guidance, to be applicable far beyond the limits of present science, and to be essential to the *Weltanschauung* of the future. They differed on the details of this extensiveness, and Pearson had a much more fully developed view of its political significance.

Pearson's thought and decisive significance come into focus when he is understood both within the context of his own time and in his position as a transitional figure between two bodies of thought widely separated in time, namely, that of Comte and the British Communist theorists of science of the 1930s, such as L. T. Hogben, who recalled that his generation had "been suckled on the *Grammar of Science*" (1957, p. 326, quoted in Porter 2004, p. 7). Pearson is free of Comte's overt hostility to the public expression of opinion, but he is not free of the model of religion. He comments at one point that there is no Pope in science (Pearson 1905, p. 62) and observes that doubt is integral to science and part of science's mystery (Pearson 1937, pp. 50–51). This means for him that a scientific hierarchy persecuting scientific heresy would be fatal to progress. But to say that science has no high priest is of course not to say that it has no religious or quasi-religious significance; indeed, it is to hint at the opposite. Pearson was also greatly concerned with the Comtean question of what should replace traditional religion in an age of science. He was fascinated, as Saint-Simon had been, with the idea of medieval society and the idea of a unified culture, which of course required a new religion. Like Comte's and Mill's religion of humanity, he predicted the deification of man (Pearson 1888, p. 31). He was against "rights," against individualism, for solidarity, and for the state, in principle. Toward present state practice he was hostile: his mode of expressing hostility to liberalism was to denounce the elected officials and bureaucrats for their systematic incompetence and to work for reforms in science education. His underlying statism overcame his expressions of hostility to the state, however, and despite his hostility to brute force, he made an exception for offenders against the state whom he said should be strung up.

Pearson resolved these apparently conflicting impulses under the label "free thought." He hoped for the establishment of "poets, philosophers, and scientists ... as 'high priests'" (Pearson 1888, p. 20) and for the elevation of "reason, doubt, and the 'enthusiasm of the study' above the 'froth"

and 'passion' of the 'marketplace'" (Ibid., pp. 130–31, 133). How was this to be accomplished? Through "the guidance of the masses by their educated sympathizers," by brains and numbers, as a contemporary follower of Comte put it (Porter 2004, p. 108). Science, in short, enabled liberal politics, with its froth and passion, to be replaced by the leadership of the scientifically elevated. This presupposed a particular conception of the nature of politics, owed to Saint-Simon, in which the real questions of politics were administrative ones, which, for Pearson, meant they could be handled unemotionally and without bias. One of the functions of statistics was to override subjectivity and produce consensus. The scope of applicability of the scientific method, as he construed it, was not only extensive but almost universal, and especially applicable to political questions. The aim of scientific education was to make citizens who could think in this way. And thinking in this way would make politics without coercion, based on consensus, possible (Pearson 1937, pp. 11–14).

This yields a model of science state relations of considerable complexity, with some intriguing gaps. Science as an activity was itself justified by the fact that "its existence tends to promote the welfare of human society" (Ibid.), meaning, that it produces social stability and social efficiency, the analogue of Comte's order and progress. Even pure science could be justified in this way, because the record shows that it is difficult to predict whether effort in pure science will produce, in the long run, the practical results that would warrant state expenditure on science. But the major role of science is to produce unforced consensus, at least *within* science. The consensus produced by science, of course, must be accepted by citizens, and this is where education and popularization come in, and Pearson gave these topics much thought. He argued that there was an opportunity to upgrade craft training by including the underlying scientific principles of the craft as part of the educational experience. More generally, he was concerned with the right way to inculcate the scientific, unbiased, cast of mind. Mere perusal of works on science, he thought, did not lead to this result: the close study of some small area scientifically, however, did (Ibid., pp. 15–16). He believed that one could expect a high degree of carry-over between this experience of study and the role of the citizen. Pearson was no egalitarian with respect to the hierarchy of scientific talent, however, and the role of the semi-educated citizen was still primarily one of respect for the priests of science, whose consensual judgments on the many areas in which they had no direct knowledge citizens would be bound to accept.

Moreover, there was a problem of epistemic deviance, which demanded strong measures: "The abnormal perceptive faculty (i.e., the kind that failed to arrive at the consensual conclusion assumed to be more or less automatically produced by persons with normally evolved perceptual powers), whether that of the madman or the mystic, must ever be a danger to human society, for it undermines the efficiency of the reason as a guide to conduct" (Ibid., p. 120). Lack of conformity to the canons of legitimate inference, Pearson says, is "anti-social" whether it involves believing "in a sphere in which we cannot reason" or believing on insufficient evidence that a cab will be available at eight o'clock when others depend on us catching a train at half past. These are treated as "ethical" matters, but the ground of ethics is in the end social utility (Ibid., pp. 54-55). Yet the hand of enforcement is never made visible by Pearson, and the stress is on "educational" means of overcoming "superstition" and other deviations of belief.

Pearson's epistemology is also relevant here. For him, the facts of science are perceptual successions, correlations, not the objects of theory, such as genes and atoms. So the idea of arriving at an unforced consensus on these is plausible. What is less plausible is the idea that political questions can be resolved into issues of perceptual succession. Pearson's examples of how political questions can be transformed into questions about correlations included Poor Law reform, about which "the blind social instinct and the individual bias at present form extremely strong factors of our judgment" (Ibid., p. 29). He did not regard these as "valuative" or consider the problem of value pluralism. He thought such questions could be resolved by considerations of national efficiency. The main finding of science that concerned him most was the basic law of heredity that "like produces like." He applied this to the problem of government and national strength by proposing eugenic control over population quality, emphasizing the elimination of the unfit, the racially inferior, and always stressing the necessity for the reproduction of the best minds. This was consistent with socialism, for him, because he believed that socialism required superior persons.

LEFT WING POLITICS AND LIBERALISM

We may call the conception of science of Condorcet, Saint-Simon, Comte, and Pearson an "extensive" conception of science: it is a conception which assumes that something in science, its method, in the case of Pearson; its methodological principle of seeking "positive" laws, in the case of Comte;

or its possession of an overarching principle, in the case of Saint-Simon, could be extended into the realms of the social and political, thus abolishing the necessity for politics, or in Saint-Simon's famous (proto-Marxist) interpretation, replace politics with "the administration of things." Science could be conceived more extensively in a variety of ways: as incorporating technology and engineering, as including the social and mental sciences, as including the policy sciences, even as a source of ethics, a popular theme in the post-Darwinist period. All of these figure in the late Victorian discussion of science. But one form of extension becomes, for the next few decades, especially controversial. The way in which Pearson and later Thorstein Veblen talk about science and engineering, as a cast of mind that carries over from one activity or topic to others, is paralleled, though with significant differences in meaning, by the German notion of *Weltanschauung*. Mach and his successors, including the Logical Positivists and especially Otto Neurath, were interpreted, and sometimes interpreted themselves, as providing a scientific world picture—they did not use the term *Weltanschauung*, to better distinguish their own ideology as authoritative. The quest for a scientific *Weltanschauung* played a role in German thought analogous to the role that the problem of the replacement of traditional religion had played in British and French thought. The problem of whether science could provide a *Weltanschauung* produced a novel issue about the cultural status of science that was highly consequential for what followed in the German-speaking world, and ultimately in the Anglo-American world.

In 1931 an event took place that transformed the discussion of the political character of science. During a congress of history of science in London, a fully developed Marxian account of science was presented. It had been developed in the Soviet Union quite independently of Western Marxism, and sponsored at the highest level of the Soviet ideological apparatus by Nikolai Bukharin, who participated in the volume that presented it. The account was couched in historical rather than philosophical terms, though the two were scarcely separate: Bukharin's own main theoretical work was entitled *Historical Materialism*, which opened with these sentences: "Bourgeois scholars speak of any branch of learning with mysterious awe, as if it were a thing produced in heaven, not on earth. But as a matter of fact, any science, whatever it be, grows out of the demands of society or its classes" (Bukharin 1969, p. 9). The volume of articles applying these ideas had a profound galvanizing effect, especially in Britain. The major point of this text was to show in detailed case studies that science

was also the product of the demands of the time for technological results, that the demands were specific to particular social formations and historical situations, and that "theory" was ultimately driven by technological practice. This implied that the idea of an autonomous realm of pure science was a sham and an ideological construction.

One of the central ideas of Marx was that when the conflict between the potentials of the forces of production and the restrictive and limiting class structure and system of economic relations was at its greatest was a revolutionary moment. One of the central ideas of both the fascists and the Soviets was that the rational planning of the economy and cultural spheres was possible and necessary. These ideas had a strong grip on the publics and policy makers of the 1930s, faced with the Depression, in the liberal states as well. In the case of science, a large literature developed on "the frustration of science," the idea that capitalists, incompetent bureaucrats, and liberal politicians stood in the way of the kinds of scientific developments that could overcome the all too apparent failures of capitalism. And there were also two interesting public declarations, one in the late 1920s, another in the early 1930s, by prominent Anglican churchmen, one suggesting a moratorium on science for a decade to allow for a reconsideration of its social consequences, another calling on scientists to consider the social responsibility of scientists.

Out of this situation came a complex, multifaceted Left movement, partly Communist, partly non-Communist, which sought to resolve society's problems through science. John Bernal was the principal figure in this movement and publically embraced Communism. Recall that Condorcet, Comte, and Pearson faced the problem that the condition for their account of science to contribute to progress was that citizens become scientifically educated, if only in a limited way, which required scientists to be, in effect, ideologists, whose ideology was authoritative for the rest of society. This was tantamount to rule by scientists, which even the most enthusiastic Left scientists, such as Bernal, regarded as impractical (though he still regarded it as preferable in principle, raising the question of whether Bernalism was Pearsonism in the vestments of Communism). Communism was not rule by scientists, though it involved an authoritative ideology which regarded itself as scientific. So, it was the closest practical approximation of the ideal of rule by scientists available at the time, and these scientists were deeply interested in the way in which the Soviet Union worked and used science. The leaders of the Marxization of science accommodated the realities of the Soviet Union by arguing first that this

was the one country in which science had obtained its proper function, as Bernal put it, and secondly, by taking the view that the Soviet system was benign (all that the phrase "the dictatorship of the proletariat" meant, according to Julian Huxley (1932, p. 3), was that things were administered for the benefit of all). They also argued that neutrality was impossible for the scientist, especially in face of the anti-scientific drive of Fascism, that money for science would flow freely in a rationally organized regime with economic planning rather than markets, and that history was at present in a transitional phase toward a state in which science, understood extensively as implying "a unified, coordinated, and above all conscious control of the whole of social life" (Ibid.), held out the prospect of abolishing the dependence of man on the material world, while taking its rightful role of becoming the conscious guiding force of material civilization, permeating all other spheres of culture.

Science and Communism, in short, were made for each other: the full realization of each required the full realization of the other. There was no conflict between science and Communism, because, as Bernal said, science already is Communism, performing the task of human society, and is doing so in the Communist way, in which "men collaborate not because they are forced by superior authority or because they blindly follow some chosen leader, but because they realize that only in this willing collaboration can each man find his goals. Not orders, but advice, determines action" (1939, pp. 415-16). In practice, as Bernal envisioned it, scientists would be organized into trade unions which would cooperate with other trade unions in producing the five-year plans that they would then carry out.

THE CRITIQUE OF EXTENSIVENESS

Bernal and his comrades understood that the issue which made their position unpersuasive to scientists was the notion of planning itself, and the question of what the planning of science would entail. The issues over planning were overshadowed, however, by a discussion of Nazi science in scientific circles that dominated the late 1930s. Nazi science was not only planned, it was extensive in the problematic sense that was pointed to by Lenin's notion that no cultural organization in the Soviet regimes should have autonomy from the party. Under the Nazis, science was expected to conform to Nazi ideology, scientists who were Jews were expelled, and a loud campaign against the Jewish influence in science was mounted. A

translation of a paper published in a Nazi journal was published in *Nature* (Stark 1938), and it prompted a huge response in Anglo-American science, cast in terms of “freedom” and the link between scientific freedom and democracy. This provided the initial spur to a discussion of the “autonomy” of science. Bernal responded to this literature by defining the issues in similar terms, as a conflict between freedom and efficiency, which he thought could be resolved within the framework of planning, though this required, as Bernal acknowledged, a redefinition of the notion of “freedom,” and a Hegelian notion of the positive freedom of scientists under planning.

The issues of planning, freedom of inquiry, and the autonomy of science produced the complex response that Jarvie elucidates (2001). Michael Polanyi provided an argument for the autonomy of science which was shaped as the claim that science was not in need of political governance in the form of planning, because it was already “governed” sufficiently by its own traditions. Science was a community as distinct from the sort of bureaucratic order that could be made subject to planning. Planning would destroy the feature of community life that made possible the growth of ideas, which was, for Polanyi, the freedom of the scientist to choose which ideas to pursue.

Polanyi’s version of this argument addresses the problem of science and democracy in a novel way. If science thus understood is subject to “democratic control,” it would not flourish. But science is not an anomaly for democracy. It is similar in character to other communities which are granted autonomy on the basis of their strongly traditional, self-governing character, such as the church and the legal profession. And democracy itself, for Polanyi, is strongly traditional. So the relation between science and democracy should be one of mutual recognition and respect, from one community to another, as well as democracy’s interest in the fruits of science, which can best be gained by granting the scientific community autonomy (Polanyi 1951). But autonomy was justified by the specific character of the scientific community *qua* community. James Conant puts this succinctly:

Would it be too much to say that in the natural sciences today the given social environment has made it very easy for even the emotionally unstable person to be exact and impartial in his laboratory? The traditions he inherits, his instruments, the high degree of specialization, the crowd of witnesses that surrounds him, so to speak (if he publishes his results)—these all exert

pressures that make impartiality on matters of *his* science almost automatic. (1947, p. 7; italics in the original)

These mechanisms, however, exist only for science proper—not for its extensions into politics, where the scientist has no special claim to objectivity or authority.

Both Conant and Polanyi had a liberal approach to science in the following sense: they thought it was best to govern science indirectly, by facilitating scientists’ competition. But Conant, acknowledging the realities of “big science,” thought it was necessary to have a set of major elite universities with massive resources in order to make this competition meaningful in the present. Conant’s view allowed for intervention when competition failed, and Conant was anxious to provide the conditions for competition. Popper, by stressing the central role of falsification and depicting science as a process of conjecture and refutation, gave a vivid picture of the nature of scientific competition and its underlying character.

Popper could have, but did not, develop an analogy between liberal discourse and scientific discourse, and if he had done so the relations between his account and the Liberal approach might have been more evident. Both science and liberal democratic discussion are limited forms of discourse, governed by a shared sense of boundaries. Popper’s way of bounding science, the use of falsification as a demarcation criterion, may have led him to think that there was no need to locate a supporting ethos or tradition. But the difference between the verificationist theory of meaning and falsification serves to place Popper on their side in the question of scientism as a *Weltanschauung*. Verification faces out, so to speak, to those forms of purported knowledge that science might hope to supplant or discredit. It is directed at the larger community. Falsification looks in, to the process of scientific discussion that it regulates, and in regulating makes into a variant of liberal discussion.

THE GHOST OF BERNAL

The Left in Britain had been motivated by the idea of the “frustration of science,” the idea that capitalism underinvested in science to the detriment of humanity. This vanished in the Cold War era and the later investment in biotechnology by private capital. Yet the emergence of modern “technoscience” as a phenomenon and the political issues associated with

its control make Bernal's questions of the 1930s relevant again, though in an odd way. The Left, in the 1960s, became "participatory" and valued the idea of the superior rationality of science and revolutionary ideology less and popular protest movements more. This meant that the Left welcomed popular protest against science and technology, against expertise, and against the global system of capital. Technoscience was now seen as a part of this system. When the global warming movement developed, however, there was a turn back to science, and to the idea of scientific consensus as an authority superior to politics and liberal democracy, and to the idea that liberal democracy was a fatally flawed system that was incapable of dealing with modern technical reality. This had been Bernal's thesis as well.

Reading Bernal today, one senses the momentous character of this change in the status of science on the Left. One indicator of the change is the fact that Bernal was, unbelievable as this might seem, an advocate of the warming of the Northern Hemisphere by technological means, praising the efforts of the Soviet Union to make its northern regions habitable through climate changes that would have affected the whole hemisphere as a heroic application of science for human good (1939, pp. 379–80). It is perhaps only a grim irony that these efforts were part of the Gulag, and that the camps that the Soviets established, and the rail lines that they built to serve them, were swallowed up by the cold, and succeeded only in serving as a means of killing those who were condemned to work on them (Alexopoulos 2017, p. 153). The reasons for the change are clear enough. When capitalists embraced science for profit and cloaked it in slogans about human betterment, such as "better living through chemistry," the critics of capitalism shifted their own vocabulary and concerns to the language of risk and the risk of environmental catastrophe, and placed science in the role of regulator of capitalism.

It is striking that Philip Kitcher's *Science, Truth, and Democracy* (2001) retraces the path of the 1930s Leftists discussed here (Turner 2003). The notion of planning science for the public good, the problem of authority over selecting that good and of its dependence on scientific advance, and even the idea of science as a map useful for multiple purposes, which are the key elements of the text, are already there in the 1930s literature, as is the idea of the contract between science and society and the slogan that experts should be on tap rather than on top. Kitcher's updating of these arguments runs into a difficulty that Comte and Pearson recognized: the social sciences do not, at least yet, provide the right kind of knowledge. Kitcher's concern is with the problem of using the social sciences to pre-

dict the outcomes of decisions to implement or develop particular forms of science and technology, and he concedes that they are not capable of providing the scientific guidance needed.

With the idea of a Rawlsian standard for evaluation in mind, as well as the new emphasis on risk, he proposes something more modest: that we take adequate knowledge of effects as an ideal standard by which to judge decisions. He treats the problem of authority in terms reminiscent of Saint-Simon's labeling of workers as "associates," by suggesting that decisions be made on the model of the family, by which he means an association in which each protects the interests of the other, in a paternalistic way, if necessary. He acknowledges the disparity in knowledge between participants. He assumes, as Saint-Simon did, that in a relation of family-like association, the conditions for trusting acceptance of superior knowledge will hold, and those with knowledge will not abuse their power out of self-interest or self-delusion, that they will be, in Bernal's phrase, "communists." But he does not explain how scientists will acquire the character needed to exercise this self-control, and he cannot explain how any of this might work, any more than Saint-Simon could explain how politics would be replaced the administration of things. Instead, he opts to treat these unworkable models as ideal moral standards for evaluating what is actually done, thus avoiding the difficult issues that Bernal at least attempted to address.

The problems with which Condorcet began, and with which Saint-Simon grappled, are still the problems of a reasonable Left. To achieve the goals of human betterment requires the greater use of science, and also for people to become more scientifically educated or at least to become deferential to science. This program did not succeed, as the literature attempting to improve on it implicitly acknowledges. So, what a Left conception of science needs today is a way to replace it, to replace the goals it attempted to achieve, or to replace the attempted accommodation to liberal democracy. The critics of the Left, the remaining advocates for the Liberal conception of science, are not well-situated either. The Liberal conception of science depended, by its own account, on institutions that guaranteed the independence of scientists in their choice of projects and on an ethos or community tradition that was strong enough to constrain its members, and on a kind of science not concerned with consensus but with refutation. As Jarvie pointed out, it underplayed the dependence of science on the wider society, indeed, was in denial about it (2001, p. 559). But it is also true that the idealized model of science they constructed is farther

than ever from the reality of science today. As the “replication crisis” has made painfully evident, the constraints of the tradition and its former high valuation of refutation are now compromised or threatened. In part, this is a result of the success of science itself, which has transformed the former “community” of science in innumerable ways, from its grant-driven institutional structure to its extension into domains of policy and regulation which demand consensus rather than contention. Jarvie’s message of 2001 is still relevant: we have not developed a solution to the problem of the relation of science and democracy. And the larger failure lies with the liberal conception of science, which, for the reasons Jarvie sets out, proved unable to address these changes.

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